



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,864	07/31/2003	Takashi Miyazawa	116747	9076

25944 7590 05/27/2005

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

TUROC, DAVID P

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 05/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,864

Applicant(s)

MIYAZAWA, TAKASHI

Examiner

David Turocy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
4a) Of the above claim(s) 21-30 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-13 and 15-20 is/are rejected.
7) ☐ Claim(s) 14 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/23/2005.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group 1 in the reply filed on 3/23/2005 is acknowledged. The traversal is on the ground(s) that a search for either group would necessarily result in a search of all the groups because the claims are all related and therefore the restriction is improper. This is not found persuasive because the method as claimed can be utilized in any vacuum apparatus without the necessity of a stage to hold the substrate. Therefore the search for group I does not result in a complete search for the apparatus.

The requirement is still deemed proper and is therefore made FINAL.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claim 12 and 14 are objected to because of the following informalities:
- a. Claim 12 at line 2, the phrase "the preliminary ejection step performing the preliminary ejection" is unclear. For the purposes of applying art the phrase is interpreted to be "performing the preliminary ejection".

b. Claim 14 at line 2, the phrase " a detecting an arranged position" is unclear. For the purposes of applying art the phrase is interpreted to be "detecting an arranged position".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 8 and 13 recites the limitation "the time of changing of the material in the ejection step" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. The claims from which claims 8 and 13 depend do not specify a changing of material in the ejection step.

Appropriate correction required

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 7, 9-12, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Abstract 2000-323276 by Seki et al, hereafter Seki in view of Japanese Patent Abstract 06-306181 by Hiraga et al, hereafter Hiraga '181 and further in view of US Patent 6130682 by Kohno et al, hereafter Kohno.

Seki teaches of a method of manufacturing an electro-optical device by depositing the electron-transporting layer, hole-transporting layer and light-emitting layer by the ink jet method and then subsequently forming an electrode (abstract). Seki discloses partitions separate pixels from each other are formed in advance on the base and the material is arrange in the partitions (Abstract, Figures).

Seki fails to disclose ejecting the material in a vacuum apparatus that is adjusted to a pressure as claimed.

However, Hiraga '181, teaching of a method of producing an organic optical thin film, discloses controlling the structure at a lower temperature without causing the heat decomposition of the optical material by spraying the material in a high-vacuum vessel, adjusted to a pressure of 10^{-4} torr or below (abstract).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Seki to dispense the coating material in a vacuum chamber suggested by Hiraga '181 to provide a desirable organic optical film because Seki teaches using an ink jet method to dispense an organic optical material and Hiraga '181 teaches a high vacuum provides an organic optical film deposited at a lower temperature which does not result in the heat decomposition of an optical film.

Seki in view of Hiraga '181 fails to disclose the claimed amount of vacuum utilized during the ejection process. However, Hiraga '181 discloses adjusting the pressure of 10^{-4} torr or below, which overlaps and/or encompasses the ranges as claimed. In the case where the claimed ranges "overlap or lie" inside ranges disclosed by prior art a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257 191 USPQ 90. See MPEP 2144.05.

Seki in view of Hiraga '181 fails to disclose detecting ejection failure of a nozzle in the vacuum chamber and the claimed processes of the detection.

However Kohno discloses a method for detecting failure of an ink jet nozzle during a coating operation (abstract). Kohno discloses detecting the ink discharge, immediately prior to the coating operation, to determine any trouble with the ejection head (Column 2, lines 5-8). Kohno discloses using a preliminary ejection area on the base, other than the coating area and detecting the ejection failure using the light-transmissivity of the ejected material (Column 2, lines 25-35). Kohno discloses detecting the ejection failure of the nozzle in order to minimize associated wastes (Column 3, lines 32-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seki in view of Hiraga '181 to use the detection of

Art Unit: 1762

ejection failure as suggested by Kohno to provide a desirable ink jet coating of a substrate because Kohno discloses detecting ink jet nozzle failure is known in the art to provide a coating operation with minimized associated waste and therefore would reasonably be expected to effectively minimize waste in the production of electro-organic devices manufactured using the ink jet method.

8. Claims 1-4, 7, 9-12, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6660545 by Furusawa, hereafter Furusawa in view of Japanese Patent Abstract 07-252670 by Hiraga et al, hereafter Hiraga '670 and further in view of US Patent 6130682 by Kohno et al, hereafter Kohno.

Furusawa discloses a method of manufacturing an electronic device including forming a conductive layer constituting a transistor using an ink jet method and followed by forming an insulating layer or semiconductor layer (Column 7 line 64 – Column 8, lines 32, Column 9, lines 31-44). Furusawa discloses applying the conductive layer using a solvent, i.e. organic solvent, as well as an appropriate solvent and/or surface tension regulator for ink jet methods (Column 8, lines 33-44).

However, Hiraga '670, teaching of a method of producing thin films, discloses capturing waste gases, of the solvent, using a vacuum chamber during the coating process (abstract). Hiraga '670 discloses the waste gas capturing device captures the

Art Unit: 1762

solvent medium discharged in the high vacuum vessel at a low temperature resulting in a high quality thin film with high efficiency (abstract).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Furusawa to dispense the coating material in a vacuum chamber suggested by Hiraga '670 to provide a thin film because Furusawa teaches using an ink jet method to dispense an coating material including a solvent and Hiraga '670 teaches a high vacuum effectively captures solvent waste gases during a coating process to form high quality thin film.

Furusawa in view of Hiraga '670 fails to disclose the claimed amount of vacuum utilized during the ejection process. However, Hiraga '670 discloses adjusting the pressure to a high vacuum, and it is the examiners position that adjusting the extent of the reduction of pressure is a result effective variable. If pressure were high it would result in improper capturing of solvent gases and a low pressure would result in no added benefits of increase solvent capture.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the pressure used in the process of Furusawa in view of Hiraga '670, through routine experimentation, to effectively and efficiently capture the solvent gas in the coating process.

Furusawa in view of Hiraga '670 fails to discloses detecting ejection failure of a nozzle in the vacuum chamber and the claimed processes of the detection.

However Kohno discloses a method for detecting failure of an ink jet nozzle during a coating operation (abstract). Kohno discloses detecting the ink discharge, immediately prior to the coating operation, to determine any trouble with the ejection head (Column 2, lines 5-8). Kohno discloses using a preliminary ejection area other than the coating area and detecting the ejection failure using the light-transmissivity of the ejected material (Column 2, lines 25-35). Kohno discloses detecting the ejection failure of the nozzle in order to minimize associated wastes (Column 3, lines 32-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Furusawa in view of Hiraga '670 to use the detection of ejection failure as suggested by Kohno to provide a desirable ink jet coating of a substrate because Kohno discloses detecting ink jet nozzle failure is known in the art to provide a coating operation with minimized associated waste and therefore would reasonably be expected to effectively minimize waste in the production of electro-organic devices manufactured using the ink jet method.

9. Claims 5, 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Hiraga '181 and Kohno and further in view of US Patent 6769756 by Su et al., hereafter Su.

Claim 5: Seki in view of Hiraga '181 and Kohno teach all the limitations of these claims as discussed above, however Seki in view of Hiraga '181 and Kohno fails to disclose detecting ejection failure by ejecting material onto a preliminary member in the predetermined area.

However, Su discloses detection nozzle failure by providing a preliminary member in the predetermined area, ejecting the material to the preliminary member and detecting the failure of the nozzle on the basis of the ejection (Column 7, lines 10-16). Therefore Su reasonably suggests to one of ordinary skill in the art to provide a preliminary member to determine the ejection failure during an ink jet printing. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a preliminary member to detect ejection failure, as disclosed by Su, in the method of Seki in view of Hiraga '181 and Kohno with the expectation of achieving equivalent results.

10. Claims 8 and 13: Seki in view of Hiraga '181 and Kohno teach all the limitations of these claims as discussed above, however Seki in view of Hiraga '181 and Kohno fails to disclose detecting ejection failure at the time of changing the material in the ejection step.

However, Su discloses many factors result in nozzle failure during ink jet (Column 2, lines 27-46). Su discloses determining nozzle failure is essential because a single clogged nozzle, during an ink jet printing process, may result in an objectionable and noticeable defects, i.e. banding or voids, in the print quality (Column 2, lines 27-46).

Art Unit: 1762

Therefore Su reasonably suggest to one of ordinary skill in the art to detect ejection failure throughout the ink jet printing process, as taught by Seki in view of Hiraga '181 and Kohno, including after a material change, because small nozzle defects are a significant factor in improper quality of the printed output.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Hiraga '181 and Kohno and further in view of US Patent 6296354 by Hashimoto, hereafter Hashimoto.

Seki in view of Hiraga '181 and Kohno teach all the limitations of these claims as discussed above, however Seki in view of Hiraga '181 and Kohno fails to disclose detecting the light reflectivity of the ejected material to determine ejection failure.

However, Hashimoto discloses determining the existence of material, during an ink jet printing, by using a reflection photosensor (Column 7, lines 51-57). Hashimoto discloses the degree of transmission of light depends on the light transmitted or reflected off of the material (Column 7, lines 51-57). Therefore Hashimoto reasonably suggests measuring the amount of light transmitted through the material and/or the amount of light reflected off the material are substitutes for each other for determining the material present. Therefore, it would have been obvious to one skilled in the art at the time of the invention to substitute the light reflection photosensor, which measure the amount of light reflected off the material, for the light transmissive photo sensor as taught by Seki in view of Hiraga '181 and Kohno with the expectation of achieving

Art Unit: 1762

equivalent results.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furusawa in view of Hiraga '670 and Kohno as applied to claim 15 above and further in view of US Patent Publication 2001/0027011 by Hanaoka et al, hereafter Hanaoka.

Furusawa in view of Hiraga '670 and Kohno teaches all the limitations of these claims as discussed above, and in addition Furusawa discloses patterns that separate wires are formed from each other in advance on the base and an insulating material is formed by CVD in the patterns followed by the deposition of the conductive material (abstract, Figures).

However Furusawa in view of Hiraga '670 and Kohno fails to discloses forming the insulating material by the method of arranging material.

However, Hanaoka, teaching of a method for forming semiconductor devices, discloses forming an insulating layer in the patterns that separate wires by either CVD or the ink-jet method (Paragraph 0107-0108). Therefore Hanaoka discloses CVD and the ink jet method are known substitutes for depositing insulating film during the manufacture of electronic devices and it would have been obvious to one skilled in the art at the time of the invention to modify Furusawa in view of Hiraga '670 and Kohno to deposit the insulating film in the patterns by ink-jet method as taught by Hanaoka because Hanaoka discloses ink-jet printing is a known method for depositing insulating films in semiconductors.

Allowable Subject Matter

13. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: None of the prior art cited or reviewed by the examiner taught or reasonably suggests detecting positional arrangement of material, between the arranged position and a target position, after a preliminary ejection and subsequently *performing positional correcting the nozzle to correct any deviation between the arranged position and the target position.*

Conclusion

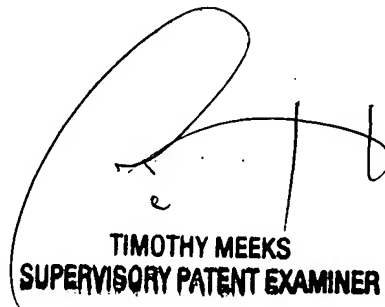
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
Au 1762



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER